Abstrak

Konstruksi jalan harus memiliki kekuatan serta durabilitas yang tinggi agar dapat melayani beban lalu lintas yang ada sesuai dengan umur rencananya. Kerusakan konstruksi jalan harus diminimalisir risikonya, salah satunya dengan metode self healing. Sebelum diuji kemampuan self-healing-nya, serat baja yang bersifat padat dan sebagai konduktor yang baik harus diuji karakteristik mekanisnya dalam campuran AC-WC. Karakteristik mekanis yang diuji terdiri dari uji karakteristik Marshall dan karakteristik volumetrik. Dengan kadar aspal 5.7%, penambahan 0.25%, 0.5%, 0.75%, dan 1 % serat baja meningkatkan nilai VFA, Stabilitas, dan Marshall Quotient serta menurunkan VITM, VMA, dan Flow. Namun, nilai VITM yang didapat berada dibawah ketentuan 3%, dikarenakan rongga yang ada sudah mendekati batas minimum tanpa penambahan serat baja serta kadar aspal yang ada juga cukup tinggi. Kadar Serat Baja Optimum yang didapat sebesar 0.625%. Nilai stabilitas Marshall yang didapat, dikonversi menjadi nilai Modulus Elastisitas yang kemudian di analisis respons mekanistiknya dengan menggunakan program KENPAVE. Dari program KENPAVE didapat nilai regangan horizontal, regangan vertical serta model prediksi kerusakannya (Nd dan Nf). Penambahan serat baja 0.25%, 0.5%, 0.75%, dan 1% menurunkan regangan horizontal dan regangan vertikal yang diterima akibat beban yang bekerja, yang artinya meredam regangan yang diterima. Repetisi izin fatigue (Nf) serta repetisi izin rutting (Nd) mengalami penurunan seiring penambahan persen kadar serat baja, tetapi jumlah repetisi beban yang didapat berdasarkan kerusakan fatigue dan rutting lebih besar dari repetisi rencananya yang sebesar 2000000 untuk setiap persen kadar serat bajanya. Serat baja direkomendasikan sebagai bahan additive dalam perkerasan jalan.

Kata kunci : *Serat Baja, Karakteristik Mekanis, AC-WC, Kadar Serat Baja Optimum, KENPAVE.*

Abstract

Road construction must have the strength and high durability to be able to serve the existing traffic load by the planned age. Damage to road construction must be minimized, one of which is self-healing methods. Before testing its self-healing ability, steel fibers that are solid and as good conductors must be tested for their mechanical characteristics in the AC-WC mixture. The mechanical characteristics tested consist of the Marshall characteristic test and the volumetric characteristic. With asphalt content of 5.7%, the addition of 0.25%, 0.5%, 0.75%, and 1% of steel fiber increase the value of VFA, Stability, and Marshall Quotient and reduce VITM, VMA, and Flow. However, the VITM value obtained is below the 3% requirement, because the existing cavity is nearing the minimum limit without the addition of steel fibers and the bitumen content is also quite high. Optimum Steel Fiber content obtained by 0.625%. The Marshall stability value obtained is converted to the Modulus of Elasticity value which is then analyzed for its mechanistic response using the KENPAVE program. The KENPAVE program obtained horizontal strain values, vertical stretches, and damage prediction models (Nd and Nf). The addition of steel fibers 0.25%, 0.5%, 0.75%, and 1% decreases the horizontal strain and vertical strain received due to the workload, which means it reduces the strain received. Fatigue cracking permit repetition (Nf) and permanent deformation permit repetition (Nd) decreased with the addition of percent steel fiber content, but the amount of load repetition obtained based on fatigue and rutting damage was greater than the planned repetition of 2000000 for each percent of steel fiber content. Based on its mechanical cSteel fiber is recommended as an additive in road pavement.

Keywords : *Steel fiber, Mechanical Characteristics, AC-WC, Optimum Steel Fiber Content, KENPAVE.*